CLAIMS

What is claimed is:

1. An imaging system comprising:

an antenna assembly including at least a first antenna apparatus, each antenna apparatus configured to transmit toward and receive from a subject, including a person and any discernable objects with the person, in a subject position, electromagnetic radiation in a frequency range of about 100 MHz to about 2 THz, from positions spaced from the subject position, the antenna assembly producing an image signal representative of the received radiation; and

a controller adapted to produce from at least a first portion of the image signal first image data corresponding to a first image of at least a portion of the subject having a first resolution, and to produce from at least a second portion of the image signal second image data corresponding to a second image of at least a portion of the subject having a second resolution greater than the first resolution.

2. The system of claim 1, in which the antenna assembly is adapted to operate selectively in a first mode to produce the first portion of the image signal, and in a second mode to produce the second portion of the image signal, the controller being further adapted to operate the antenna assembly in the first mode, to determine whether the first image includes characteristics corresponding to an object on the person, and when the first image is determined to include characteristics of an object, to operate the antenna assembly in the second mode appropriate for the antenna assembly to produce the second portion of the image signal corresponding to the characteristics of an object.

3. The system of claim 2, in which the antenna assembly further includes a second antenna apparatus adapted to produce the second portion of the image signal, and the processor is further adapted to operate the first antenna apparatus during operation of the antenna assembly in the first mode, and to operate the second antenna apparatus during operation of the antenna assembly in the second mode.

4. The system of claim 3, in which the antenna assembly further includes a first moving mechanism adapted to move the first antenna apparatus relative to the subject position, and a second moving mechanism adapted to move the second antenna apparatus relative to the first moving mechanism.

5. The system of claim 4, in which the first moving mechanism also is adapted to move the second antenna apparatus relative to the subject position.

6. The system of claim 2, in which the first and second images include a common portion of the subject.

7. The system of claim 6, in which the first portion of the image signal includes at least part of the second portion of the image signal.

8. The system of claim 2, in which the processor is adapted to generate the first image data with picture elements having different levels of intensity, and to determine a correlation of the levels of intensity of at least one group of picture elements with the levels of intensity of a corresponding reference group of picture elements that are characteristic of an object.

9. The system of claim 8, in which the processor is further adapted to identify as the second portion of the image signal at least a portion of the first image data corresponding to which there is at least a threshold correlation of the levels of intensity of the at least one group of picture elements.

10. The system of claim 9, in which the processor is further adapted to determine the correlation of the levels of intensity of the at least one group of picture elements by determining a correlation value for a given picture element as a function of the intensity level of one or more other picture elements.

11. The system of claim 10, in which the processor is further adapted to determine the correlation value for a given picture element by determining a correlation value for the given picture element that is based on the intensity levels of a group of associated picture elements arranged relative to the given picture element.

12. The system of claim 11, in which the processor is further adapted to determine the correlation value for the given picture element by modifying the original intensity level of each picture element of the group of associated picture elements, by an amount related to the position of the picture element in the group relative to the given element, and combining the modified intensity levels.

13. The system of claim 12, in which the processor is adapted to modify the original intensity level by associating a factor with each picture-element in the group of picture-elements, with at least two of the factors being different, and multiplying the original intensity level of each picture element in the group by the factor associated with the picture element.

14. The system of claim 13, in which the group of adjacent picture-element positions includes a center picture-element position, with the factor associated with the center picture-element position having a value greater than the value of the other factors.

15. The system of claim 14, in which the group of adjacent picture-element positions form at least one row of picture-element positions, with the factors of the picture-element positions in the at least one row including at least one positive value and at least one negative value.

16. The system of claim 15, in which the group of adjacent picture-element positions form a grid of columns and rows of picture-element positions, with the factors of the picture-element positions in each row and column alternating between positive and negative values.

17. The system of claim 1, in which the second image includes at least a portion of the first image.

18. The system of claim 17, in which the first and second image data includes picture elements each having a level of intensity, and the second image data includes picture elements having levels of intensity based on levels of intensity of one or more corresponding picture elements in the first image data.

19. The system of claim 18, in which the second image data includes picture elements having levels of intensity determined by interpolating picture elements in the first image data.

20. The system of claim 17, in which the second image is enlarged compared to the first image.

21. An imaging system comprising:

an antenna assembly including at least a first antenna apparatus, each antenna apparatus configured to transmit toward and receive from a subject, including a person and any discernable objects with the person, in a subject position, electromagnetic radiation in a frequency range of about 100 MHz to about 2 THz, from positions spaced from the subject position, the antenna assembly producing an image signal representative of the received radiation, the antenna assembly being adapted to operate selectively in a first mode to produce a first portion of the image signal, and in a second mode to produce a second portion of the image signal corresponding to a portion of the first portion of the image signal; and

a controller adapted to control operation of the antenna assembly, to produce from at least the first portion of the image signal first image data representative of a first image of at least a portion of the subject, and to produce from at least the second portion of the image signal, second image data representative of a second image corresponding to a portion of the first image, and to cause the antenna assembly to operate in the second mode in response to an indication associated with the second portion of the image signal determined from the first portion of the image signal.

22. The imaging system of claim 21, in which the processor is further adapted to determine whether the first image includes characteristics corresponding to an object on the person, and to produce the indication when the first image is determined to include characteristics of an object, with the second portion of the image signal corresponding to the portion of the image signal having the characteristics of an object.

23. The imaging system of claim 22, in which the antenna assembly further includes a second antenna apparatus adapted to produce the second portion of the image signal, and the processor is further adapted to operate the first antenna apparatus during operation of the antenna assembly in the first mode, and to operate the second antenna apparatus during operation of the antenna assembly in the second mode.

24. The imaging system of claim 23, in which the antenna assembly further includes a first moving mechanism adapted to move the first antenna apparatus relative to the subject position, and a second moving mechanism adapted to move the second antenna apparatus relative to the first moving mechanism.

25. The imaging system of claim 24, in which the first moving mechanism also is adapted to move the second antenna apparatus relative to the subject position.

26. The imaging system of claim 22, in which the processor is adapted to generate the first image data with picture elements having different levels of intensity, and to determine a correlation of the levels of intensity of at least one group of picture elements with the levels of intensity of a corresponding reference group of picture elements that are characteristic of an object.

27. The imaging system of claim 26, in which the processor is further adapted to identify as the second portion of the image signal at least a portion of the first image data corresponding to which there is at least a threshold correlation of the levels of intensity of the at least one group of picture elements.

28. The imaging system of claim 27, in which the processor is further adapted to determine the correlation of the levels of intensity of the at least one group of picture elements by determining a correlation value for a given picture element as a function of the intensity level of one or more other picture elements.

29. The imaging system of claim 28, in which the processor is further adapted to determine the correlation value for a given picture element by determining a correlation value for the given picture element that is based on the intensity levels of a group of associated picture elements arranged relative to the given picture element.

30. The imaging system of claim 29, in which the processor is further adapted to determine the correlation value for the given picture element by modifying the original intensity level of each picture element of the group of associated picture elements, by an amount related to the position of the picture element in the group relative to the given element, and combining the modified intensity levels.

31. The imaging system of claim 30, in which the processor is adapted to modify the original intensity level by associating a factor with each picture-element in the group of picture-elements, with at least two of the factors being different, and multiplying the original intensity level of each picture element in the group by the factor associated with the picture element.

32. The imaging system of claim 31, in which the group of adjacent picture-element positions includes a center picture-element position, with the factor associated with the center picture-element position having a value greater than the value of the other factors.

33. The imaging system of claim 32, in which the group of adjacent picture-element positions form at least one row of picture-element positions, with the factors of the picture-element positions in the at least one row including at least one positive value and at least one negative value.

34. The imaging system of claim 33, in which the group of adjacent picture-element positions form a grid of columns and rows of picture-element positions, with the factors of the picture-element positions in each row and column alternating between positive and negative values.

35. A method of surveilling a subject, the subject including a person and any discernable objects with the person, the method comprising:

transmitting toward the subject in a subject position, electromagnetic radiation in a frequency range of about 100 MHz to about 2 THz, from positions spaced from the subject position;

receiving from the subject electromagnetic radiation emitted from the subject in response to the transmitted electromagnetic radiation;

producing an image signal representative of the received radiation; and

producing from the image signal, first image data corresponding to a first image of at least a portion of the subject having a first resolution, and second image data corresponding to a second image of at least a portion of the subject having a second resolution greater than the first resolution.

36. The method of claim 35, further comprising determining whether at least a portion of the first image data corresponding to the first image includes characteristics corresponding to an object on the person, and when the first image data corresponding to the first image is determined to include characteristics corresponding to an object, producing the second image data corresponding to a portion of the image signal associated with the first image data including characteristics corresponding to an object.

37. The method of claim 36, in which transmitting radiation includes transmitting radiation on a first antenna apparatus and transmitting radiation from a second antenna apparatus; receiving radiation includes receiving radiation on the first antenna apparatus in response to radiation transmitted on the first antenna apparatus, and receiving radiation on the second antenna apparatus in response to radiation transmitted on the second antenna apparatus; and producing an image signal includes producing the first portion of the image signal representative of the radiation received on the first antenna apparatus, and producing the second portion of the image signal representative of the radiation received on the second antenna apparatus.

38. The method of claim 37, further comprising moving the second antenna apparatus relative to the first moving mechanism.

39. The method of claim 38, further comprising supporting the second antenna apparatus relative to the first antenna apparatus, and moving the second antenna apparatus relative to the subject position by moving the first antenna apparatus.

40. The method of claim 36, in which generating first image data includes generating first image data having picture elements with different levels of intensity, and identifying at least a first portion of the first image data includes determining a correlation of the levels of intensity of at least one group of picture elements with the levels of intensity of a corresponding reference group of picture elements.

41. The method of claim 40, in which determining a correlation of the levels of intensity further includes identifying at least a portion of the first image data corresponding to which there is at least a threshold correlation of the levels of intensity of the picture elements in the at least one group of picture elements with the levels of intensity of the reference group of picture elements.

42. The method of claim 41, in which identifying at least a portion of the first image data includes determining a correlation value for a given picture element as a function of the intensity level of one or more other picture elements.

43. The method of claim 42, in which determining a correlation value for a given picture element includes determining a correlation value for the given picture element that is derived from the intensity levels of a group of associated picture elements arranged relative to the given picture element.

44. The method of claim 43, in which determining the correlation value for the given picture element derived from the intensity levels of an associated group of picture elements includes modifying the original intensity level of each picture element of the group of associated picture elements, by an amount related to the position of the picture element in the group relative to the given element, and combining the modified intensity levels.

45. The method of claim 44, in which modifying the original intensity level includes associating a factor with each picture-element in the group of picture-elements, with at least two of the factors being different, and multiplying the original intensity level of each picture element in the group by the factor associated with the picture element.

46. The method of claim 45, in which associating a factor includes associating a factor with each picture element in a group of adjacent picture-element positions including a center picture-element position, with the factor associated with the center picture-element position having a value greater than the value of the other factors.

47. The method of claim 46, in which associating a factor includes associating a factor with each picture element in a group of adjacent picture-element positions forming at least one row of picture-element positions, with the factors of the picture-element positions in the at least one row including at least one positive value and at least one negative value.

48. The method of claim 47, in which associating a factor includes associating a factor with each picture element in a group of adjacent picture-element positions forming a grid of columns and rows of picture-element positions, with the factors of the picture-element positions in each row and column alternating between positive and negative values.

49. The method of claim 35, in which producing second image data includes producing second image data corresponding to a second image that includes at least a portion of the first image.

50. The method of claim 49, in which the first and second image data includes picture elements each having a level of intensity, and producing second image data includes producing second image data with picture elements having levels of intensity based on levels of intensity of one or more corresponding picture elements in the first image data.

51. The method of claim 50, in which producing second image data includes producing second image data with picture elements having levels of intensity determined by interpolating picture elements in the first image data.

52. The method of claim 49, in which producing second image data includes producing second image data corresponding to a second image that is enlarged compared to the first image.

53. An imaging system comprising:

means for transmitting toward the subject in a subject position, electromagnetic radiation in a frequency range of about 100 MHz to about 2 THz, from positions spaced from the subject position;

means for receiving from the subject electromagnetic radiation emitted from the subject in response to the transmitted electromagnetic radiation;

means for producing an image signal representative of the received radiation; and

means for producing from at least a first portion of the image signal, first image data corresponding to a first image of at least a portion of the subject having a first resolution; and

means for producing from at least a second portion of the image signal, second image data corresponding to a second image of at least a portion of the subject having a second resolution greater than the first resolution.

54. The imaging system of claim 53, further comprising means for determining whether the first image data corresponding to the first image includes characteristics corresponding to an object on the person, and in which the means for producing the second image data is further for producing the second image data from a portion of the image signal associated with the first image data including characteristics corresponding to an object.

55. The imaging system of claim 54, in which the means for transmitting radiation is further for transmitting radiation on a first antenna apparatus and transmitting radiation from a second antenna apparatus; the means for receiving radiation is further for receiving radiation on the first antenna apparatus in response to radiation transmitted on the first antenna apparatus, and receiving radiation on the second antenna apparatus in response to radiation transmitted on the second antenna apparatus; and the means for producing an image signal is further for producing the first portion of the image signal representative of the radiation received on the first antenna apparatus, and producing the second portion of the image signal representative of the radiation received on the second antenna apparatus.

56. One or more storage media having embodied therein a program of commands adapted to be executed by a computer processor to:

receive an image signal generated in response to an interrogation of a subject, including a person and any objects carried by the person, with electromagnetic radiation in a range of about 100 MHz to about 2 THz;

produce from at least a first portion of the image signal, image data corresponding to a first image of at least a portion of the subject; and

produce from at least a second portion of the image signal, image data corresponding to a second image of at least a portion the first image.

57. The storage media of claim 56, in which the program embodied therein is further adapted to be executed by a computer processor to determine whether the image data corresponding to the first image includes characteristics corresponding to an object on the person, and when the image data corresponding to the first image is determined to include characteristics corresponding to an object, produce the image data corresponding to a second image from a portion of the image signal associated with the image data including characteristics corresponding to an object.

58. The storage media of claim 57, in which the program embodied therein is further adapted to be executed by a computer processor to produce from at least a first portion of the image signal, image data having picture elements with different levels of intensity, and determine a correlation of the levels of intensity of at least one group of picture elements with the levels of intensity of a corresponding reference group of picture elements having intensity levels corresponding to an object.